Art. I.—*Australasian Characeae.*

A Synopsis by

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(Communicated by A. D. Hardy, F.L.S.).

[Read 14th March, 1918].

More than a quarter century has elapsed since Professor Nördstedt published—at Stockholm, in 1888—"Fresh Water Algae Collected by Dr. S. Berggren in New Zealand and Australia in 1874-5"; and, at Lund, in 1891, his "Australasian Characeae, Part I." The latter comprised 10 plates, each with a specific diagnosis, of cosmopolitan application, and a description applicable to the Australasian specimens only. In a short introduction the Author stated :—

"Baron Ferd. von Mueller, who is the Author of several illustrated works on the Australian Flora, has invited me to issue a similar work dealing with the Characeae. It is with his help that I begin this undertaking, the continuation of which must largely depend upon such circumstances as the receipt of adequate material and the necessary time being available. I hope it may be the means of inducing other botanists in Australia to study these plants, and thus arrive at better results than is now possible."

The following species were figured and described :—

Nitella partita, Nordst. - -	Queensland.
„ *subtilissima*, Al. Br. -	West Australia.
„ *leptosoma*, Nordst. - -	New Zealand.
„ *tumida*, Nordst. - -	South Australia.
„ *tricellularis*, Nordst. -	New Zealand.
„ *congesta*, (R. Br.) Al. Br. -	Tasmania; North and South Coasts, Australia.
Chara Braunii, Gmel. - -	Victoria, South Australia, Queensland and N.S.W.
„ *leptopitys*, A. Br. - -	Victoria and Tasmania.
„ *l.* sub-sp. *subebracteata*, Nordst. - - -	W.A., Victoria and N.Z.
„ *scoparia*, (Bauer), Al. Br. *C. Muelleri*, Al. Br. -	Victoria, N.S.W.

The following synopsis was prepared for private use, but as it may be of use to Australian students, Professor Nördstedt has consented to its publication :—

Synopsis of the Australasian Charcaeae.

1. NITELLA.

A. Monarthrodactylae, ultimate segments of the leaves one-celled.
  a. Simply branched.
    ! Dioecious, nucleus with 11 striae - - *polygyra*, A. Br.
  b. Repeatedly branched.
    ! Monoecious, segments of leaves large, nucleus 215μ long - - - - - - - *Stuartii*, A. Br.

B. Diarthrodactylae, ultimate segments of the leaves 2 (rarely 3-) celled, ultimate cell mucroniform or bi-tripartite.
  a. Homeophyllae, leaves similar.
    aa. Dioecious.
      c1. Ultimate cells bi-tripartite - - - *partita*, Nordst.
      c2. Ultimate cells undivided, mucroniform.
        d1. Nucleus 180-200μ long, covered with scattered very small spines - - *Sonderi*, A. Br.
        d2. Nucleus 230-300μ long.
          e1. Fertile spicate heads 1½-2-2½ mm. in diameter.
            f1. Sterile leaves branched with very short tips - - - - - *gloeostachys*, A. Br.
            f2. Sterile leaves not branched with very short tips, nucleus punctated with minute granules - - *subtilissima*, A. Br.
          e2. Fertile whorls not in small spicate heads.
            g1. Nucleus covered with small dentate scales - - - - - *penicillata*, A. Br. (=*Gunnii*, A. Br.)
            g2. Nucleus minutely granular - *Robertsonii*, A. Br.
        d3. Nucleus 430-470μ long, with small granules, more closely together than on N. subtillissima - - - - *remota*, A. Br.
    bb. Monoecious.
      h1. Leaves simply branched or twice-trice-divided, the ultimate divisions not much abbreviated.
        i1. Leaves simply branched.
          k1. Heads not enveloped in mucus (cf. polyarthrod.) - - - *tricellularis*, Nordst.
          k2. Heads enveloped in mucus - *microphylla*, A. Br.
        i2. Leaves repeatedly branched.
          l1. Leaves (commonly) only twice divided (seldom more)
            m1. Antheridium 350μ - - - *conformis*, Nordst.

m2. Antheridium 165-200μ, nucleus 300-350μ long, with 8 striae - *leptosoma*, Nordst.

m3. Antheridium 150-166μ, nucleus 230-250 (-300)μ long, 6 striae, minute - - - - - - *batrachosperma*, (Rchb.) A. Br.

m4. Antheridium 200-230μ, nucleus 300-320μ long, 6-7 striae, large - *pseudoflabellata* f. *mucosa* (partly).

l2. Leaves commonly trice divided, ultimate segments (3-) 4-6 (-7), primary segment longer than half the divided leaf, nucleus 300-360μ *pseudoflabellata*, A. Br.

———fruit enveloped in mucus f. *mucosa*, Nordst.

h2. Sect. Polyglochin or Brachydactylae. Upper leaves, in part often four times divided, the ultimate divisions (almost always sterile) forming a 2-4-cuspidate crown.

n1. Coronula of the sporangium short.

o1. Oogonia solitary - - - - - *oligospira*, A. Br.

o2. Oogonia aggregated - - - *microcarpa*, A. Br.

n2. Coronula of the sporangium elongated - - - - - - - *polyglochin*, A. Br.

b. Heterophyllae. Leaves dissimilar (some smaller ones in the same verticil as the larger).

p1. Dioecious.

q1. The ultimate segments inflated - *tumida*, Nordst.

q2. The ultimate segments not inflated

r1. The small adventitious leaves fewer (1-20), larger leaves 1-3 times divided.

s1. Smaller leaves 1-6 (-12), terminal segments of leaves commonly 3-5, stem 250-720μ in diam. - - *conglobata*, A. Br.

s2. Smaller leaves about 14, ultimate segments of leaves commonly 5-7, stem about 1 mm. in diam., spec. doubtful - - - - - - *heterophylla*, A. Br.

r2. The small adventitious leaves about 40; the larger partly 4 times divided - - - - - *congesta*, A. Br.

p2. Monoecious - - - - - - *hyalina* (DC.), Kütz.

C. Polyarthrodactylae. Ultimate segments of the leaves 3-6-celled, often not mucroniform.

s1. Dioecious.

t1. Fertile verticills not contracted into heads, sterile leaves of lower verticills simple - - - - *diffusa*, A. Br.

t2. Fertile verticills contracted into heads, more or less dense or interrupted.
u1. Fertile and sterile leaves 3-4-divided, terminal cell of the last segment nearly as thick as the penultimate cell - - - - *myriotricha*, A. Br.
u2. Sterile leaves often simple, fertile 1-2 divided.
v1. Nucleus 300-380μ long - - *cristata*, A. Br.
v2. Nucleus 200-270μ long, fertile heads in mucus.
x1. Fertile verticills loosely condensed, terminal segments of the leaves acute, gradually attenuate - - *tasmanica* (F. Müll) A. Br.
x2. Fertile verticills densely contracted, terminal segments obtuse *gelatinosa*, A. Br.
v3. Nucleus 160-180μ long, with 5 striae - - - - - - *polycephala*, A. Br.
s2. Monoecious.
y1. Fertile verticills not contracted into elongated, gelatinous spikes *Hookeri*, A. Br.
y2. Fertile verticills contracted into elongated, gelatinous spikes (interrupted at the base.
z1. Slender; terminal segments of the fertile leaves 2-3-celled - - *leptostachys*, A. Br.
z2. Stouter; terminal segments of fertile leaves bicellular - - *interrupta*, A. Br.
z3. Fertile verticills contracted into small, not gelatinous heads - - *tricellularis*, Nordst.

2. TOLYPELLA.

a. Monoecious, ultimate cells obtuse - - - *glomerata*, (Desv.) Leonh.
b. Dioecious, spec. nova (?), according to Groves.

3. LYCHNOTHAMNUS.

Monoecius, oogonia and antheridia on different nodes of the same plant; radical, unicellular, globose bulblets - - - - *macropogon*, A. Br.

4. CHARA.

A. Haplostephanae. Crown of stipulae consisting of a single (simple) series of cells.
a. Ecorticatae. Stem and leaves naked.
c1. Dioecious. Bracts minute or wanting - *australis*, R. Brown.
Terminal segment of leaves short, obtuse (not acute or apiculate) subspec. - *plebeja*, A. Br.
c2. Monoecious.

d1. Antherida and oogonia conjoined. Bracts on all the nodes of the leaves — *Braunii*, Gmel. (=*coronata*).

d2. Antheridia and oogonia separated, oogonia, but not antherida, in the fundus of the verticil - *succincta*, A. Br., f. *novicaledonica*, Nordst. ined.

b. Corticatae. Stem variously corticated.

e1. Haplostichae. Series of cortex cells equal to the number of leaves.

f1. Dioecious - - - - - *submollusca*, Nordst.

f2. Monoecious - - - - *myriophylla*, F. Müll., A. Br.

e2. Diplostichae. Series of cortex cells double the number of leaves.

f1. Dioecious.

g1. Both antheridia and oogonia in the fundus of the verticills - *leptopitys*, A. Br., and subsp. *subebracteata*, Nordst.

g2. Neither antheridia nor oogonia in the fundus of the verticill (small, slender, stipules pressed against the verticill).

h1. Unistipulatae. Stem with small papillae - - - - - *mollusca*, A. Br.

h2. Bistipulata. Stem more or less spinescent - - - - *dichopitys*, A. Br.

f2. Monoecious.

i1. Gymnophyllae. Leaves usually naked.

k1. Stipules large.

l1. Antheridia and oogonia on the same node. Nucleus black with many different forms, as: aequistriata (subf. polyphylla), f. tylacantha, v. duriuscula, acanthopitys and trachypitys. — *gymnopithys*, A. Br.

l2. Antheridia and oogonia on different nodes of the same leaf (verticil with 14-16 leaves) — *Griffithii*, A. Br.

k2. Stipules small (nucleus black or brown) - - - - - *Drummondii*, A. Br.

i2. Gymnopodes. Leaves usually corticated, except the first, lowest node - - - - *Hydropitys*, A. Br. (not seen in Australia).

e3. Triplostichae. Series of cortex cells triple the number of leaves - - *Muelleri*, A. Br.

B. Diplostephanae. Circle of stipules consisting of a double (rarely triple) series of cells.

l1. Diplostichae. Series of cortex cells double the number of leaves

m1. Tylacantae. Primary cells (with the spines) of the cortex prominent (monoica) - - - - *contraria* and v. *Behriana*, A. Br.

m2. Aulacantae. Secondary cells of the cortex prominent - - *foetida*, A. Br.

l2. Triplostichae. Stem triply corticated.

n1. Phloeopodes. Basal segment of the leaves corticated
Monoecious.

o1. Nucleus black - - - - *fragilis*, Desv.

n2. Nucleus yellowish - - - *leptosperma*, A. Br. (dubious as Australian).

n2. Gymnopodes. The first segment of the leaves naked - - *gymnopus*, A. Br., v. *ceylonica* (Klein), A. Br., which name is older than gymnopus.